Fishlab, Centre for Human Palaeoecology
Department of Archaeology
The King's Manor, York YO1 7EP

Reports from *Fishlab*, the Centre for Human Palaeoecology, University of York

Report **2004/09**

The fish bone from Wharram Percy: Sites 9, 12 and 71

by

James H. Barrett

31st May 2004

Please address all non-academic enquiries concerning these reports to the Centre for Human Palaeoecology, Department of Archaeology, University of York, The King's Manor, York YO1 7EP (e-mail: biol38@york.ac.uk).

THE UNIVERSITY of York

The fish bone from Wharram Percy: Sites 9, 12 and 71

James H. Barrett

Introduction

This report presents an analysis of approximately 250 identified fish bones from sites 9, 12 and 71 of Wharram Percy. Sites 9 and 12 were peasant houses of broad medieval date. Site 71 was the fishpond area with phased deposits dating from the 13th to late 15th/16th centuries. The material was virtually all hand collected. One small bag of material from context 206 of Site 71 was sieved to an unknown (but fine, perhaps 1mm) mesh size and another bag from context 213 of the same site may also have been sieved based on the material it included. However, both of these groups included mostly tiny unidentifiable fragments. As a whole, the assemblage must be viewed as hand collected and thus seriously biased against small fish (e.g. Jones 1982).

Despite the small sample size, loose dating and poor recovery the assemblage is informative. As noted previously (Ryder 1974), it is clear that almost all of the material is from marine fish. The diversity of marine species is also high, including herring, cod, haddock, ling, hake, whiting, plaice, conger eel, halibut, ray and shark. Butchery marks suggest that some of the cod was probably imported dry as stockfish or a similar product. Other marine species may also have arrived cured, but some were probably also consumed fresh based on element distributions that indicate whole fish in some instances. It is remarkable that fresh water catches are only represented by a single pike vertebra and seven eel bones, particularly given that Site 71 was the fishpond area.

Methods

The assemblage was recorded following the York protocol, which is described by Harland *et al*. (2003). It entails the detailed recording of c.20 diagnostic elements. These bones are identified to the finest possible taxonomic group and recorded in detail – typically including, as appropriate, element, side, count, measurements, weight, modifications (including burning and butchery), fragmentation, texture and estimates of fish size. Although identified as diagnostic elements, fish vertebrae are recorded in slightly less detail (measurements are not taken and texture is not scored, for example). 'Non-diagnostic' elements (quantification category 0) are only identified beyond class for special reasons. Examples include butchered specimens and bones of species otherwise missing from the assemblage.

The assemblage has been quantified by number of identified specimens (NISP), including all bones or only the diagnostic elements as indicated. The complete archive has been submitted to the Wharram Post-Excavation Project with this report, as a Microsoft Access database file and a series of text files that duplicate its content, and will be kept on file at the University of York *Fishlab*. The small number of measurements follow Harland *et al*. (2003) and references therein. A list of Latin and common names for all taxa in the assemblage is included in Appendix 1.

Preservation

The fish bone from Wharram Percy was generally well preserved (Table 1). Including all specimens, c.14% of the assemblage was burnt. However, most of the heat altered bones were tiny unidentified fragments from the two bags recovered by sieving (see above). Otherwise virtually all of the assemblage was unburned. The most common surface texture was 'good' (lacking fresh appearance, but otherwise solid with very localised flaky or powdery areas) and the most common category of bone completeness was 80 to 100%. There was one specimen with evidence of carnivore tooth impressions and three additional bones were crushed, either by mastication or trampling (Wheeler & Jones 1989). The sample sizes are too small to draw meaningful intra-site comparisons, but overall the assemblage seems to have suffered relatively little taphonomic attrition. It must be noted, however, that hand collecting is likely to favour relatively intact and well-preserved specimens.

Results

A total of 1092 specimens were examined, 246 of which were identifiable diagnostic elements and a further two of which were ray teeth (which are not typically quantified using the York protocol). Thirteen taxa occur in the assemblage if one excludes broad groups such as cod family that are also represented by species level identifications (Table 2). Eleven of these are marine and two are freshwater or migratory between salt and freshwater. In rank order, the marine species are: herring (99 specimens), cod (82 specimens), haddock (22 specimens), ling (12 specimens), plaice (4 specimens), conger eel (2 specimens), hake (2 specimens), whiting (1 specimen), halibut (1 specimen), shark order (1 specimen) and ray family (2 teeth, which are not formally quantified). The only truly freshwater species was pike (1 specimen). However, the eels (7 specimens) were probably also freshwater catches. The paucity of freshwater fish may be partly due to poor recovery – many of the marine species are very large – but this bias cannot explain why there is an abundance of tiny herring bones rather than more eel and pike specimens.

The collection is too small and biased by poor recovery to justify much analysis of element distributions (Table 3). Nevertheless, several patterns do merit comment. Firstly, the distribution of cod bones strongly suggests that some dried (or dried and salted) fish may have been transported to the site. There are few abdominal vertebrae and cranial elements (all of which are typically removed from dried cod), whereas caudal vertebrae, cleithra and supracleithra (which typically remain in dried cod) are the most abundant elements for this species (cf. Barrett 1997). This pattern cannot be a recovery bias as caudal vertebrae are smaller than abdominal vertebrae and the supracleithrum is one of the smallest bones of a fish skeleton. It is also inconsistent with preservation bias as cod cleithra are fragile (Jones 1991). The abundance of haddock cleithra should not, however, be interpreted in the same way. There is no other indication that dried haddock were brought to the site and the cleithrum of this species is anomalously robust (von den Driesch 1994). Other species may have been imported as cured fish, but the element distribution data cannot demonstrate this alone given the tiny sample sizes. Fish were also brought to Wharram Percy whole, and thus probably fresh, given the presence of some cranial elements even for species like cod that mostly arrived in a processed state.

Although modest in number, cut-marks observed on nine specimens augment these interpretations. Seven marks (four on cod, two on ling and one on a cod, saithe or pollack) are consistent with dried fish production (Table 4; cf. Barrett 1997). They include three transverse cuts on caudal vertebrae (made when the anterior vertebrae are cut away), three cuts on cleithra (made during decapitation) and one cut on a supracleithrum (also made during decapitation). These marks may imply that dried ling were also brought to the site, an observation that could not be supported based on the element distribution data alone. Conversely, the ling may simply have been transported whole and decapitated at Wharram Percy. The two remaining butchery marks, one on a cod ceratohyal and one on a cod posterior caudal vertebra, are less easily classified according to function.

Given that the assemblage was hand collected, it is not surprising that most of the specimens represent large fish (Table 5). The majority of the gadid bones were from fish of 50 to 100cm total length and even the plaice specimens were from large individuals (50-80cm total length). The principle exception is herring, for which most specimens derived from fish of less than 30cm total length. These estimates are based on comparison with reference specimens of known size. Too few measurements could be taken to justify quantitative analysis.

Discussion

Despite its limitations, this assemblage does suggest the transport of a wide diversity of marine fish to Wharram Percy, in both whole (probably fresh) and cured states. It also implies that the use of freshwater fish was far less common. The vast majority of the material, including the butchered specimens, derived from Phase 4 of Site 71. Thus these conclusions can be attributed predominately to the fishpond area (but not to the aquatic inhabitants of the fishpond itself) in the late 13th-14th centuries.

These patterns are consistent with broader trends in fish consumption in medieval England. The widespread use of freshwater fish declined in the eleventh century (Barrett *et al*. in press), after which they were increasingly earmarked for elite consumption (Dyer 1988). The use of herring and cod first expanded to fill the gap, but they were joined in the 13th-14th centuries by an increasing diversity of species – including haddock, ling and hake (Kowaleski 2000; Fox 2001; Barrett *et al*. in press). Christian doctrine created a high demand for fish during Lent and other periods of fasting (Woolgar 2000). Cured herring, cod and related species were thus the subjects of major medieval industries and were traded over long distances (Childs & Kowaleski 2000). It is conceivable, for example, that the dried cod at Wharram Percy were stockfish from Arctic Norway (Christensen & Nielssen 1996) and that the herring were from East Anglia or the Baltic (Holm 1996; Childs & Kowaleski 2000).

Acknowledgements

Jane Richards of West Yorkshire Archaeology Service kindly invited me to analyse the assemblage. The work was funded by the Wharram Post-Excavation Project (English Heritage).

References

Barrett, J. H. 1997. Fish trade in Norse Orkney and Caithness: A zooarchaeological approach. *Antiquity* 71:616-638.

Barrett, J. H., A. M. Locker, and C. M. Roberts. in press. 'Dark Age Economics' revisited: The English fish bone evidence AD 600-1600. *Antiquity*.

Childs, W., and M. Kowaleski. 2000. "Fishing and fisheries in the Middle Ages," in *England's Sea Fisheries: The commercial sea fisheries of England and Wales since 1300*. Edited by D. J. Starkey, C. Reid, and N. Ashcroft, pp. 19-28. London: Chatham.

Christensen, P., and A. R. Nielssen. 1996. "Norwegian Fisheries 1100-1970: Main developments," in *The North Atlantic Fisheries, 1100-1976: National perspectives on a common resource*. Edited by P. Holm, D. J. Starkey, and J. Thor, pp. 145-176. Esbjerg: North Atlantic Fisheries History Association.

Dyer, C. 1988. "The consumption of fresh-water fish in medieval England," in *Medieval fish, fisheries and fishponds in England, British Archaeological Reports British Series 182(i)*. Edited by M. Aston, pp. 27-38. Oxford: British Archaeological Reports.

Fox, H. 2001. *The Evolution of the Fishing Village: Landscape and society along the South Devon coast, 1086-1550*. Oxford: Leopard's Head Press.

Harland, J. F., J. H. Barrett, J. Carrott, K. Dobney, and D. Jaques. 2003. The York System: An integrated zooarchaeological database for research and teaching. *Internet Archaeology* 13:http://intarch.ac.uk/journal/issue13/harland_index.html.

Holm, P. 1996. "Catches and manpower in the Danish fisheries, c1200-1995," in *The North Atlantic Fisheries, 1100-1976: National perspectives on a common resource*. Edited by P. Holm, D. J. Starkey, and J. Thor, pp. 177-206. Esbjerg: North Atlantic Fisheries History Association.

Jones, A. K. G. 1982. "Bulk-sieving and the recovery of fish remains from urban archaeological sites," in *Environmental Archaeology in the Urban Context*. Edited by A. R. Hall and H. Kenward, pp. 79-85. London: Council for British Archaeology Research Report 43.

Jones, A. K. G. 1991. The fish remains from excavations at Freswick Links, Caithness. D.Phil, University of York.

Kowaleski, M. 2000. The expansion of the southwestern fisheries in late medieval England. *Economic History Review* 53:429-454.

Ryder, M. L. 1974. Animal remains from Wharram Percy. *Yorkshire Archaeological Journal* 46:42-52.

von den Driesch, A. 1994. "Hyperostosis in fish," in *Fish Exploitation in the Past: Proceedings of the 7th meeting of the ICAZ fish remains working group*. Edited by W. Van Neer, pp. 37-45. Tervuren: Musee Royal de L'Afrique Centrale.

Wheeler, A., and A. K. G. Jones. 1989. *Fishes*. Cambridge: Cambridge University Press.

Woolgar, C. M. 2000. "'Take this penance now, and afterwards the fare will improve': Seafood and late medieval diet," in *England's Sea Fisheries: The commercial sea fisheries of England and Wales since 1300*. Edited by D. J. Starkey, C. Reid, and N. Ashcroft, pp. 36-44. London: Chatham.

Table 1. Bone preservation characteristics by phase.

	Site 9	Site 12	Site 71, Phase 3	Site 71, Phase 4	Site 71, Phase 5	Site 71, Unstrat	Total
Burning (all specimens)							
Unburned	32	22	3	887	3	8	955
Burned White				100			100
Burned Brown or Black				37			37
Percent Completeness (diagnostic elements only)							
0-20%	1	1		22			24
21-40%	7	2	2	12	1		24
41-60%	1			12			13
61-80%	1	1		15		1	18
81-100%	1	4		22		1	28
Bone Texture (diagnostic elements only)							
Excellent	2	2		9		1	14
Good	4	3		44			51
Fair	4	2		26	1	1	34
Poor	1	1	2	3			7
Other Modifications (excluding butchery, all specimens)							
Carnivore Gnawing	1						1
Crushed				3			3

Table 2. NISP by phase based on diagnostic elements (other records noted as present or unidentified).

Common Name	Site 9	Site 12	Site 71, Phase 3	Site 71, Phase 4	Site 71, Phase 5	Site 71, Unstrat	Total
Shark Order	1						1
Ray Family				present			present
Eel				7			7
Conger Eel				2			2
Atlantic Herring				99			99
Pike				1			1
Cod Family			1	8			9
Cod/ Saithe/ Pollack				1			1
Cod	12	5		63	1	1	82
Haddock	2	5	1	14			22
Ling	9			2	1		12
Whiting						1	1
Hake				2			2
Halibut Family				1			1
Halibut				1			1
Flounder/ Plaice				1			1
Plaice				4			4
Unidentified Fish	8	12	1	816	1	6	844

Table 3. Fish element distribution (diagnostic elements only).

Element	Site 9	Site 12	Site 71, Phase 3	Site 71, Phase 4	Site 71, Phase 5	Site 71, Unstrat	Total
Shark Order							
Mineralized Vertebral Centrum		1					1
Eel							
Abdominal Vertebra				4			4
Caudal Vertebra				3			3
Conger Eel							
Ceratohyal				1			1
Maxilla				1			1
Atlantic Herring							
Caudal Vertebra				48			48
Abdominal Vertebra				28			28
Maxilla				9			9
Dentary				4			4
Articular				2			2
First Vertebra				2			2
Ceratohyal				1			1
Hyomandibular				1			1
Palatine				1			1
Posttemporal				1			1
Preopercular				1			1
Ultimate Vertebra				1			1
Pike							
Abdominal Vertebra				1			1
Cod Family							
Cleithrum				4			4
Preopercular				2			2
Abdominal Vertebra				1			1
Ceratohyal			1				1
Opercular				1			1
Cod/ Saithe/ Pollack							
Caudal Vertebra Group 1				1			1
Cod							
Caudal Vertebra Group 1		2	1	15	1		19
Caudal Vertebra Group 2		3		8			11
Cleithrum		4		3			7
Supracleithrum				6			6
Ceratohyal			1	3			4
Hyomandibular				4			4
Abdominal Vertebra Group 1				3			3
Infrapharyngeal			1	2			3

Table 3 cont.

Element	Site 9	Site 12	Site 71, Phase 3	Site 71, Phase 4	Site 71, Phase 5	Site 71, Unstrat	Total
Preopercular		1			2		3
Basioccipital					2		2
Dentary					2		2
Maxilla					2		2
Opercular					1	1	2
Parasphenoid					2		2
Posttemporal			2				2
Quadrate		1			1		2
Abdominal Vertebra					1		1
Abdominal Vertebra Group 2					1		1
Abdominal Vertebra Group 3		1					1
Articular					1		1
First Vertebra					1		1
Otolith					1		1
Premaxilla					1		1
Vomer					1		1
Haddock							
Cleithrum		2	3	1	5		11
Abdominal Vertebra Group 3			1		3		4
Posttemporal					2		2
Caudal Vertebra Group 1					1		1
Ceratohyal					1		1
Maxilla			1				1
Opercular					1		1
Preopercular					1		1
Ling							
Abdominal Vertebra Group 1		2					2
Abdominal Vertebra Group 2		2					2
Abdominal Vertebra Group 3		2					2
Cleithrum					2		2
Supracleithrum		2					2
Hyomandibular		1					1
Parasphenoid						1	1
Whiting							
Articular						1	1
Hake							
Maxilla					1		1
Quadrate					1		1
Halibut Family							
Abdominal Vertebra					1		1

Table 3 cont.

Element	Site 9	Site 12	Site 71, Phase 3	Site 71, Phase 4	Site 71, Phase 5	Site 71, Unstrat	Total
Halibut							
Dentary				1			1
Flounder/ Plaice							
Hyomandibular				1			1
Plaice							
1st Anal Pterygiophore				1			1
Articular				1			1
Cleithrum				1			1
Infrapharyngeal				1			1

Table 4. Butchery marks (all specimens).

Element	Common name	Interpretation	Site 9	Site 71, Phase 4
Caudal Vertebra Group 1	Cod	removing anterior vertebrae		2
Caudal Vertebra Group 1	Cod/ Saithe/ Pollack	removing anterior vertebrae		1
Caudal Vertebra Group 2	Cod		1	
Ceratohyal	Cod			1
Cleithrum	Cod	decapitation		1
Cleithrum	Ling	decapitation		1
Cleithrum	Ling	decapitation		1
Supracleithrum	Cod	decapitation		1

Table 5. Estimated total length of fish based on comparison of diagnostic elements with reference specimens of known size.

Total Length	Site 9	Site 12	Site 71, Phase 3	Site 71, Phase 4	Site 71, Phase 5	Site 71, Unstrat	Total
Conger Eel							
>1000mm				2			2
Atlantic Herring							
151-300mm				14			14
301-500mm				6			6
Cod							
301-500mm				3			3
501-800mm	2			12		1	15
801-1000mm	1	1		14			16
>1000mm	3	3		4			10
Haddock							
301-500mm		2		2			4
501-800mm	1	2	1	6			10
801-1000mm	1			2			3
Ling							
801-1000mm					1		1
>1000mm	3			2			5
Whiting							
301-500mm						1	1
Hake							
801-1000mm				2			2
Halibut							
501-800mm				1			1
Flounder/ Plaice							
301-500mm				1			1
Plaice							
501-800mm				3			3

Appendix 1. Common and Latin names of taxa identified at Kaupang.

Common Name	**Latin Name**
Shark Order	Pleurotremata
Ray Family	Rajidae
Eel	*Anguilla anguilla*
Conger Eel	*Conger conger*
Atlantic Herring	*Clupea harengus*
Pike	*Esox lucius*
Cod Family	Gadidae
Cod/ Saithe/ Pollack	*Gadus/Pollachius*
Cod	*Gadus morhua*
Haddock	*Melanogrammus aeglefinus*
Ling	*Molva molva*
Whiting	*Merlangius merlangus*
Hake	*Merluccius merluccius*
Halibut Family	Pleuronectidae
Halibut	*Hippoglossus hippoglossus*
Flounder/ Plaice	*Pleuronectes flesus/Pleuronectes platessa*
Plaice	*Pleuronectes platessa*
Unidentified Fish	Unidentifed Fish